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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/092,093	03/04/2002	Jonathan K. Ross	10018286-1	8502

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EXAMINER	
COLEMAN, ERIC	

ART UNIT	PAPER NUMBER
2183	

DATE MAILED: 09/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/092,093	ROSS, JONATHAN K.	
	Examiner	Art Unit	
	Eric Coleman	2183	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *16-21* is/are allowed.

6)☒ Claim(s) *1-3,7-14,22-24,28-31* is/are rejected.

7)☒ Claim(s) *4-6,15 and 25-27* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-3,22-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Huck (patent No. 6,370,639).

Huck taught the invention as claimed including a data processing ("DP") system comprising:

a) Means and method for performing a critical task using an operation that is speculative while a condition of a processor used for performing the critical task is unknown (e.g., see figs. 6, 7 and col. 7, lines 1-59);

b) In parallel with performing the speculative operation determining the condition (e.g., see figs. 6,7 and col. 7, lines 1-col. 8, line 14);

d) If the condition is as expected, committing a first result from the performing the critical task (e.g., (see. col. 7, line 1-col. 8, line 40);

c) If the condition is not as expected, allowing the first result to benignly fail, changing the condition to be as expected, re-performing the critical task using the

operation and committing the second result from the re-performing the critical task (e.g., see figs. 6,7 and col. 7, line 1-col. 8, line 40 and col. 9, lines 3-64).

3. As per claim 2,23 Huck taught the operation includes memory access instructions (e.g., see col. 6, lines 32-56) that inherently comprise load instructions.

4. As per claim 3,24, Huck taught assigning a speculative attribute to the operation (e.g., see col. 7, lines 1-9 and col. 7, line 60-col. 8, line 14).

5. As to the processor and instruction memory of claim 22, Huck taught a processor comprising a CPU and instruction sequencer that decodes instruction for execution and registers for storing the results (e.g., see col. 4, lines 50-65). It would have been inherent for the Huck processor to comprise some type of memory to store the instructions so they would be available for decoding and execution.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 7-14,28-31 rejected under 35 U.S.C. 103(a) as being unpatentable over Huck.

8. Huck taught the invention substantially as claimed including a data processing ("DP") system comprising:

a) Means and method for performing a critical task using an operation that is speculative while a condition of a processor used for performing the critical task is unknown (e.g., see figs. 6, 7 and col. 7, lines 1-59);

b) In parallel with performing the speculative operation determining the condition (e.g., see figs. 6,7 and col. 7, lines 1-col. 8, line 14);

d) If the condition is as expected, committing a first result from the performing the critical task (e.g., see. col. 7, line 1-col. 8, line 40);

c) If the condition is not as expected, allowing the first result to benignly fail, changing the condition to be as expected, re-performing the critical task using the operation and committing the second result from the re-performing the critical task (e.g., see figs. 6,7 and col. 7, line 1-col. 8, line 40 and col. 9, lines 3-64).

9. As per claim 2,23 Huck taught the operation includes memory access instructions (e.g., see col. 6, lines 32-56) that inherently comprise load instructions.

10. As per claim 3,24, Huck taught assigning a speculative attribute to the operation (e.g., see col. 7, lines 1-9 and col. 7, line 60-col. 8, line 14).

11. As per claims 7,28 Huck taught setting a status field to indicate an exception that occurred during execution of the associated instruction or sequence of instructions where the execution may potentially cause a program interruption (e.g., see col. 7, lines 25-40). Huck did not expressly detail (claims 7,14,28) the structure that performed the interruption. Clearly for the system to set such a status bit it bit it would have been obvious to one of ordinary skill in the DP art that a interrupt signal was received. Also to

implement the system control for interruption one of ordinary skill would have been motivated to have the system receive the interrupt signals at an interruption handler to perform the critical task (e.g., a memory access). Also (claims 8,29) since the Huck exceptions were able to be deferred it would have been obvious to one of ordinary skill the interrupts would have had to have been a interrupts that were maskable and consequently would have comprised light weight interrupts.

12. As per claims 9,11,30, Huck taught speculatively executing instructions and providing separate status for speculative and non-speculative instruction execution (e.g., see col. 7, lines 1-9). Therefore one of ordinary skill implementing the Huck system would have been motivated to separately store results of execution of speculative and other instruction in different portions of virtual memory at least to ensure that the results were easily accessible by the assigned instructions and the data was protected from altering by other programs not given access to the results.

13. Huck did not specifically (claim 10,31) detail the duplication of code. However Huck taught executing instructions speculatively and under certain conditions re-executing the instructions non-speculatively (e.g., see figs. 6,7 and col. 7, line 1-col. 8, line 40 and col. 9, lines 3-64). Therefore one of ordinary skill would have been motivated to copy the instructions because the Huck system stored the speculative and non speculative data separately and this would have allowed the system to begin the non-speculative execution before the speculative execution had finished and that would speeded up execution.

14. As per claim 11, Huck taught performing memory access speculatively without knowing the status of a condition pertaining to the memory access (namely if it caused an exception) (e.g., see. col. 7, line 1-col. 8, line 40). Huck, however, did not specifically detail that an interruption was received from an application. However, since the Huck system that was directed toward the efficient control of execution of programs in a data processing system where exceptions occurred one of ordinary skill would have been motivated to send interrupt signals from the application programs when an exception happened (e.g., see col. 10, lines 12-57).

15. As per claims 12,13 Huck taught means and method for performing a critical task using an operation that is speculative while a condition of a processor used for performing the critical task is unknown (e.g., see figs. 6, 7 and col. 7, lines 1-59); In parallel with performing the speculative operation determining the condition (e.g., see figs. 6,7 and col. 7, lines 1-col. 8, line 14); If the condition is as expected, committing a first result from the performing the critical task (e.g., see. col. 7, line 1-col. 8, line 40); If the condition is not as expected, allowing the first result to benignly fail, changing the condition to be as expected, re-performing the critical task using the operation and committing the second result from the re-performing the critical task (e.g., see figs. 6,7 and col. 7, line 1-col. 8, line 40 and col. 9, lines 3-64).

Allowable Subject Matter

16. Claims 4,5,6,15,25,26,27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

17. Claims 16-21 allowed.

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Abramson (patent No. 5,664,137) disclosed a system for executing and dispatching store operations in a computer system (e.g., see abstract).

Abramson (patent No. 5,751,983) disclosed an out-of-order processor with a memory subsystem which handles speculatively dispatched load operations (e.g., see abstract).

Feiste (patent No. 6,021,485) disclosed a system with forwarding store instruction result t load instruction with reduced stall or flushing by effective/real data address bytes matching (e.g., see abstract).

Morris (patent No. 6,631,460) disclosed advanced load address table entry invalidation based on register address wraparound (e.g., see abstract).

Moudgill (patent No. 6,032,244) disclosed multiple issue static speculative instruction scheduling with path tag and precise interrupt handling (e.g., see abstract).

Ross (patent No. 5,915,117) disclosed a computer architecture for the deferral of exceptions on speculative instructions (e.g., see abstract).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric Coleman whose telephone number is (703) 305-9674 or (571)-272-4163. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Chan can be reached on (703) 305-9712. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ERIC COLEMAN
PRIMARY EXAMINER

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